

600 Volt Stretched Lens Array for Solar Electric Propulsion, Phase I

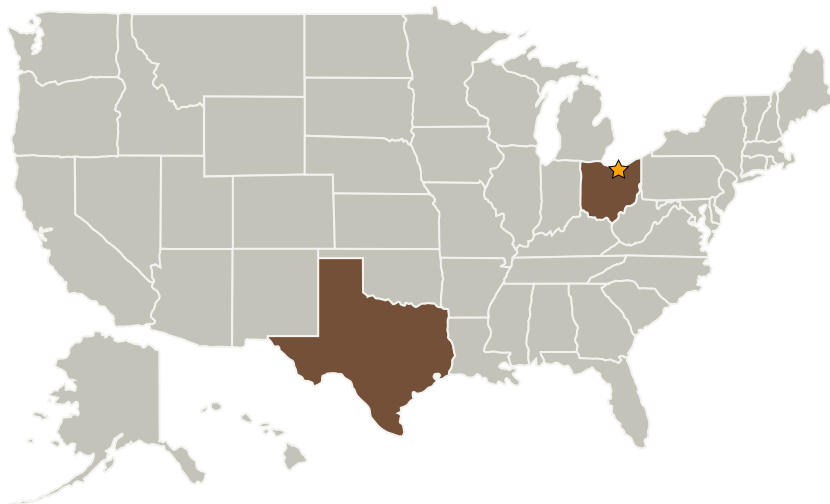
Completed Technology Project (2006 - 2007)



Project Introduction

Over the past six years, ENTECH, Auburn, NASA, and other organizations have developed a new space photovoltaic array called the Stretched Lens Array (SLA), which offers unprecedented performance (e.g., >80 kW/cu.m. stowed power, >300 W/sq.m. areal power, and >300 W/kg specific power in the very near term) and cost-effectiveness (>75% savings in \$/W compared to planar high-efficiency arrays). SLA achieves these outstanding attributes by employing flexible Fresnel lenses for optical concentration (e.g., 8X), thereby minimizing solar cell area, mass, and cost. SLA's small cell size (85% less cell area than planar high-efficiency arrays) also allows super-insulation and super-shielding of the solar cells to enable high-voltage operation and radiation hardness in the space environment. Recent studies show that SLA offers a 3-4X advantage over competing arrays in specific power for many NASA Exploration missions. ENTECH and Auburn, with Aerojet support, propose to develop and demonstrate a special version of SLA, specifically optimized for Solar Electric Propulsion (SEP) missions. This SLA for SEP will operate at 600 V to direct-drive an Aerojet Hall-effect electric thruster. Such a combination of an ultra-light, high-voltage, radiation-hard SLA with a high-specific-impulse electric thruster will have widespread applicability to many NASA, DOD, and commercial missions.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

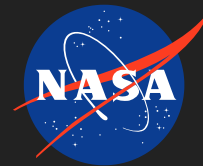
Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
ENTECH, Inc.	Supporting Organization	Industry	Keller, Texas

Primary U.S. Work Locations

Ohio	Texas
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Mark O'Neill

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.1 Power Generation and Energy Conversion
 - └ TX03.1.1 Photovoltaic